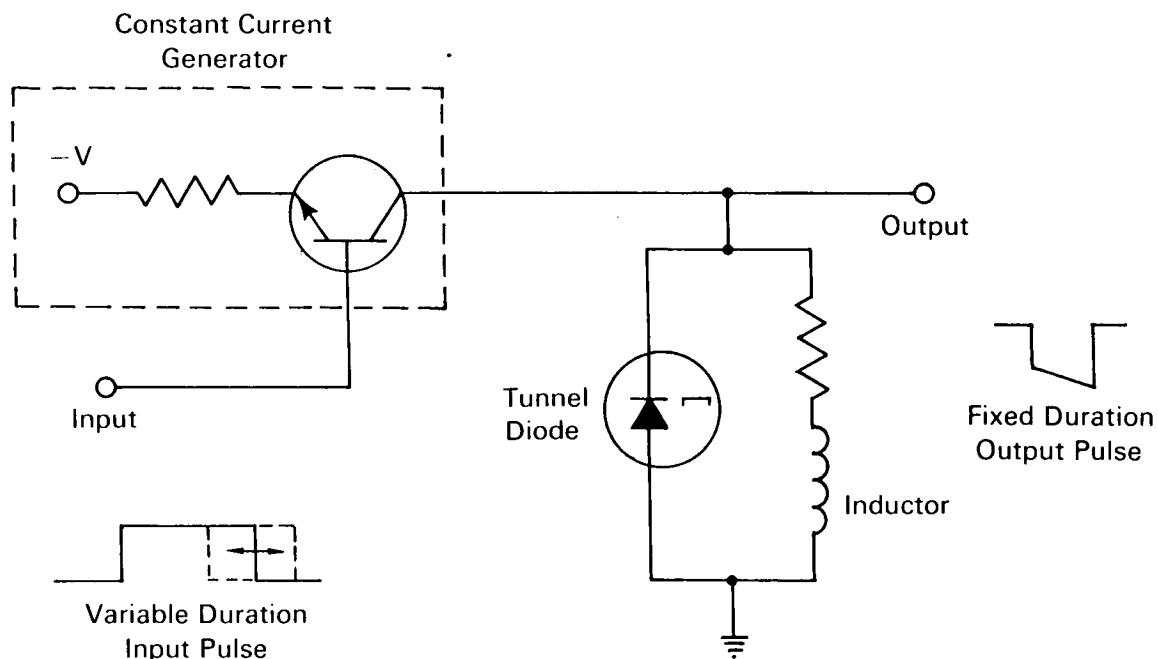


# NASA TECH BRIEF



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## Simple Circuit Produces High-Speed, Fixed Duration Pulses



**The problem:** To generate an output pulse of fixed duration from a variable duration input pulse ranging from 50 to several hundred nanoseconds. Prior art differentiated the input pulse to obtain a trigger pulse to be applied to a monostable or blocking oscillator. This method requires complex circuitry that consumes a relatively large amount of power.

**The solution:** A circuit consisting of a tunnel diode in parallel with an inductance driven by a constant-current generator. Input pulses of variable width in the nanosecond range yield output pulses of fixed width.

**How it's done:** The variable duration pulse applied to the input of the constant-current generator allows

a current to flow through the parallel network. When this current is first applied to the parallel network, the initial high impedance of the inductor causes the entire current to flow through the tunnel diode. This current is adjusted to be greater than the peak current of the tunnel diode, causing the tunnel diode to switch to its high-voltage state. Current through the inductor, initially zero, increases with time and the tunnel diode current and voltage decrease until the valley point of the tunnel diode is reached, causing it to switch to its low-voltage state. Because the inductor now has a relatively low impedance, the output voltage will be approximately zero for the duration of the input pulse.

(continued overleaf)

**Notes:**

1. Close control of output pulse width is easily accomplished by varying the value of the inductor.
2. This circuit should be of interest to designers of computer and pulsed communications equipment.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Goddard Space Flight Center  
Greenbelt, Maryland, 20771  
Reference: B65-10228

**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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(GSFC-285)